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(54)发明名称 以硅藻土为基质的微孔过滤陶瓷

(57)摘要

本发明涉及一种以硅藻土为基质的微孔过滤陶瓷，属于微孔陶瓷类，其中含有孔隙率高，比表面积大的硅藻土、硅藻土助滤剂和其余辅助材料经压力成型焙烧而成的陶瓷，其制品经实验证明比表面积为1.5-2.5m^2/g是传统的多孔过滤材料的2-6倍用本制品过滤的饮料、饮水的细菌总数、大肠杆菌均为零；孔隙率为60-80%，过滤效率提高1-2倍；耐压强度达600-1000kg/cm^2，并能在0-400℃温度范围内正常使用。

1.一种以硅藻土为基质的微孔过滤陶瓷，经压力成型焙烧而成的微孔过滤陶瓷，其中含有微孔材料和辅助材料；其特征在于该陶瓷的组成（重量%）为：

硅藻土	60—80
硅藻土助滤剂	18—40
水玻璃	0.6—1.5
纯碱	0.5—1.0

2.根据权利要求1所述的陶瓷，其特征在于所述的硅藻土粒度为为80—260目。

以硅藻土为基质的微孔过滤陶瓷

本发明涉及一种以硅藻土为基质的微孔过滤陶瓷，属于微孔陶瓷类。其制品适于饮料、酿酒、医药、食用油、饮水、石油化工、冶金机械润滑油、污水处理等方面的各类精密、无菌过滤时装用。

在工业生产的固液分离、液体的澄清净化作业中，过滤是一个重要手段，过滤精度和效率直接关系到产品的质量和成本，然而目前国内外应用的塑料、刚玉、钛和金属粉末冶金材料制成的多孔过滤元件，由于这些材料本身不具备微孔结构，在材料加工和元件制造过程中加入成孔或发泡剂之类的辅料多，工艺复杂、耗能多、制造成本高，其制品的孔隙率低（一般为20～30%），比表面积小（一般为0.2～0.5 M^2/g）而导致过滤精度，效率低，而且更达不到现代工业中的精密和无菌过滤的技术要求，因而精密无菌过滤是一个急待解决的难题。同行的科技人员都在进行探索性试验研究，但都未得到较满意的结果，如苏联专利SU—753829陶瓷多孔过滤材料，含有粘土、高岭土、金属氧化物硅藻土（2—20Wt%）和一定的矿物填料，是用于腐蚀性液体、气体如废气、废液的过滤元件的陶瓷、这种材料的孔径范围为200～250μm。上述陶瓷的组分多，成本高而硅藻土只是一般组分含量较低，由于材料不具有微孔结构，孔径较大，因此，不能满足精密，无菌过滤要求。

本发明的目的在于提供一种制造方法比较简单、能耗低、组分少、成本低、其制品的孔隙率和比表面积大、强度高、适用温度范围宽、并能达到精度和无菌过滤要求的以硅藻土为基质的微孔过滤

陶瓷。

本发明的经压制成型焙烧而成的微孔过滤陶瓷，含有微孔材料和辅助材料，其组成和含量（重量%）如下：

硅藻土　　60—80

硅藻土助滤剂　　18—40

水玻璃　　0．6—1．5

纯碱　　0．5—1．0

所述的硅藻土的粒度为80—260目

本发明的微孔过滤陶瓷与现有技术相比有如下的优点和积极效果，制造工艺简单、组分少、能耗小、降低制造成本，其制品经实验证明，比表面积为1．5—2．5 M^2/g 是传统的多孔过滤材料的2—6倍，经本制品过滤后的饮料、饮水的细菌总数、大肠杆菌都是零；孔隙率为60—80%，其过滤效率提高1—2倍；耐压强度达600—1000 kg／cm^2，并能在0—400℃温度范围内正常使用，原材料成本低，来源广泛。

本发明的实施例加以详细描述，硅藻土是近几年才开发利用的一种新材料，硅藻壳件系无定型二氧化硅、化学性质稳定、各门目的硅藻壳体都很微小，一般为2—30微米，壳体本身都具有微孔结构，孔隙率高，比表面积大，因此选用硅藻土为基质，按常规制造方法将硅藻土原矿进行烘干、粉碎、微细分级机分成不同的粒级以供制造不同精度过滤标准要求的微孔陶瓷，然后按配方的组分含量进行配料另加水15—25%搅拌均匀，压制成型、烘干、焙烧整形、组装、检验入库。（重量%）为：

硅藻土60—80

硅藻土助滤剂　　18—40

水玻璃　　0．6—1．5

纯碱　　0．5—1．0

实施例1：配料比为（重量%）100—260目的硅藻土80，硅藻土助滤剂　18．3、水玻璃1．1、纯碱0．6、外加水22%搅拌均匀、压制成型、经200—220℃干燥，再在800—900℃窑中焙烧恒温3小时、整型、组装、检验入库

实施例2：配料比为（重量%）80—100目的硅藻土70硅藻助剂28．2、水玻璃1．1、纯碱0．7外加水25%再采用实施例1的工艺条件进行搅拌、压制成型、烘干、焙烧温度调整到820—920℃恒温3小时，整型成检入库。

实施例3：配料比为（重量%）80目的硅藻土60、60目的硅藻土助剂38、水玻璃1．2、纯碱0．8外加水25同实施例1的工艺条件搅拌均匀、压力成型、烘干、焙烧而成、成检入库。

MICROPOROUS FILTERING CERAMIC USING DIATOMITE AS SUBSTRATE

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Abstract of **CN1046684**

This filtering ceramic contains diatomite with high porosity and big specific surface area, diato mite filter aid and other auxiliary materials and is obtained by pressure shaping and calcining. Experiment has proved that its specific surface area is 1.5-2.5 sq.m/g, which is 2-6 times larger than that of traditional filter materials. For the beverage or water filtered through this product, the total number of bacteria and colibacillus is equal to zero. Its other parameters include: porosity (60-80)% (so its filter efficiency is increased by 1-2 times), compression strength (600-1000) kg/sq.cm and operational temp range (0-400) deg.C.

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[54]Title of the Invention

A microporous filter ceramic with diatomaceous earth as base substance.

[57]Abstract

This invention is concerned with a microporous filter ceramic with diatomaceous earth as base substance, belonging to a kind of microporous ceramic, wherein the contained ceramic is made, by shaping under pressure and baking, from diatomaceous earth with high porosity and large specific surface area, diatomaceous earth filtering aid and other auxiliary material. Its product is proved by experiments to have a specific surface area of 1.5 to 2.5 m^2/g, 2 to 6 times of traditional porous filter materials. Both drinks and drinking water filtered by this product have zero number of bacteria and Escherichia coli. Its porosity is 60 to 80%, with the filtering efficiency raised 1 to 2 times, the compressive strength reaching 600 to 1000 kg/cm^2, and it can be normally used in the temperature range of 0 to 400°C.

[Claims]

1. A microporous filter ceramic with diatomaceous earth as base substance, formed by shaping under pressure and baking, wherein microporous material and auxiliary material are contained; characterized in that its composition (weight %) is:

diatomaceous earth: 60-80

diatomaceous earth filtering aid: 18-40

soluble glass: 0.6-1.5

sodium carbonate: 0.5-1.0

2. A ceramic as set forth in Claim 1, characterized in that the granularity of said diatomaceous earth is 80 to 260 mesh.

Description

A microporous filter ceramic with diatomaceous earth as base substance

This invention is concerned with a microporous filter ceramic with diatomaceous earth as base substance, belonging to a kind of microporous ceramic. Its product is suitable for various precise asepsis filtering in drinks, brewing, medicine, food oil, drinking water, petrochemical industry, lubrication oil for metallurgical machinery, sewage treatment, etc.

In the industry production process of separating solids from liquids, cleansing and clarifying liquids, filtering is an important means, with filtering precision and efficiency directly affecting the quality and cost of products. In the domestic and abroad application of nowadays, however, the porous filter elements are made from plastic material, corundum, titanium and metallurgical material of metallic powder. Because these materials themselves do not have porous structure, during material processing and element production, much auxiliary material of pore-making or vesicant agents is added, resulting in complicated techniques, much energy consumption and high manufacturing cost. With low porosity (generally 20 to 30%), small specific surface area (generally 0.2 to 0.5 m^2/g), the filtering precision and efficiency are low, failing to satisfy the technical demand of precise asepsis filtering in modern industry. Therefore, precise, asepsis filtering is an urgent problem to be solved. Technicians in this industry are all conducting exploratory tests and research, but reach no satisfying results. For example, the ceramic porous filter material of Soviet Union patent SU-753829 containing clay, kaolin, diatomaceous earth of metallic oxide (2 to 20 Wt%) and specified mineral filler, is used for the ceramic filtering elements of corrosive liquid, gas, such as exhaust gas, waste oil. The pore diameter of this material ranges in 200 to 250

μm. There are many constituents in the ceramic which costs much and contains little diatomaceous earth merely as an ordinary constituent. Because the material does not have microporous structure with larger pore diameter, it cannot satisfy the technical demand of precision, asepsis filtering.

The purpose of this invention is to provide a simpler manufacturing method of microporous filter ceramic with diatomaceous earth as base substance, consuming lower energy, with less constituents and low cost. Its products have high porosity and large specific surface area, high strength and wide range of applicable temperature, satisfying the technical demand of precision, asepsis filtering.

The microporous filter ceramic of this invention, formed by shaping under pressure and baking, contains microporous material and auxiliary material. Its composition and contents (weight %) are as follows.

diatomaceous earth: 60-80

diatomaceous earth filtering aid: 18-40

soluble glass: 0.6-1.5

sodium carbonate: 0.5-1.0

The granularity of said diatomaceous earth is 80-260 mesh.

Comparing the microporous filter ceramic of this invention with the existing technology, there are the following merits and positive effects: simple manufacturing techniques, less constituents and lower energy and cost. Proved by experiments, its product has specific surface area of 1.5 to 2.5 m^2/g, 2 to 6 times of traditional porous filter materials. Both drinks and drinking water filtered by this product have zero number of bacteria and Escherichia coli. Its porosity is 60 to 80%, with the filtering efficiency raised 1 to 2 times, the compressive strength reaching 600 to 1000 kg/cm^2, and it can be normally used in the temperature range of 0 to 400°C. The cost of raw material is low with wide source.

Examples of this invention are described in detail as

follows. Diatomaceous earth is a new kind of material and has not been developed and used until recent years. Diatomaceous shells are pliant silicon oxides with stable chemical properties. Diatomaceous shells of each mesh are all very tiny, generally 2 to 30 micrometer long. The shells themselves all have a microporous structure with high porosity and large specific surface area. Consequently, diatomaceous earth is chosen as base substance. Following routine manufacturing method, diatomaceous earth ore is dried by heat, crushed and fine sorted to different granularity for making microporous ceramic meeting different needs of precision filter standard. Then prepare the material according to the formula of composition and contents with addition of 15 to 25% of water and mix it well. After shaping under pressure, dry it by heat, bake and trim, assemble and inspect for warehousing. The formula is as follows (weight %).

diatomaceous earth: 60-80

diatomaceous earth filtering aid: 18-40

soluble glass: 0.6-1.5

sodium carbonate: 0.5-1.0

Example 1: Material preparation ratio (weight %) is 100 to 260 mesh diatomaceous earth 80, diatomaceous earth filtering aid 18.3, soluble glass 1.1, sodium carbonate 0.6. Mix it well with addition of 22% of water. After shaping under pressure, dry it under 200 to 220°C and bake in a kiln of constant temperature of 800 to 900°C for 3 hours, then trim, assemble and inspect for warehousing.

Example 2: Material preparation ratio (weight %) is 80 to 100 mesh diatomaceous earth 70, diatomaceous earth filtering aid 28.2, soluble glass 1.1, sodium carbonate 0.7, with addition of 25% of water. Under the art condition of Example 1, mix it well, shape under pressure, dry then bake for 3 hours with the constant temperature adjusted to 820 to 920°C, trim and inspect for warehousing.

Example 3: Material preparation ratio (weight %) is 80

mesh diatomaceous earth 60, 60 mesh diatomaceous earth filtering aid 38, soluble glass 1.2, sodium carbonate 0.8, with addition of 25% of water. Under the art condition of Example 1, mix it well, shape under pressure, dry and bake, then inspect for warehousing.